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MARSHALL STAR

In This Week's Star ⊟ (Click to Expand)

SLS Program Manager Addresses National Space Club Florida Committee: On Track for First Flight in 2017

From combined reports

The Space Launch System -- NASA's new heavy-lift launch vehicle -- is on track to send humans deeper into space than ever before, the program's manager said May 8 to a sold out crowd of the National Space Club's Florida Committee near the Kennedy Space Center.

Image right: On May 8, SLS Program Manager Todd May addresses a sold out crowd of the National Space Club's Florida Committee during the organization's monthly luncheon in Cocoa Beach, Fla. (NASA/KSC)

Todd May, SLS program manager at the Marshall Space Flight Center, noted a series of agency milestones that will leave the nation poised to explore as far as it wishes. Those milestones include a 2014 uncrewed test flight of the Orion spacecraft -- the multipurpose crew vehicle that the SLS will loft to deep space, SLS' first mission carrying an uncrewed Orion in 2017 and a 2021 crewed mission to fly by the moon and back.

"By that point, you'll have the capability to go anywhere in the solar system people want to go," May said. "The ultimate goal

is to put human boots on Mars."

Many elements of the heavy-lift rocket already are in testing, May noted, including the engines and solid rocket boosters that will give the rocket about 8 million pounds of thrust at launch -- 10 percent more than the Saturn V rocket.

NASA already has an inventory of space shuttle main engines -- the RS-25 engines -- to power the core stage. "The propulsion elements are in really good shape," May said. "Sixteen space shuttle main engines -- that's a good head start."

The SLS also will use solid rocket boosters like the shuttle, but the SLS versions will be five segments instead of four.

The core stage, which will hold the fuel tanks for the main engines, is early in its design but still is on schedule. Like the space shuttle external tanks, the core stage will be built at NASA's Michoud Assembly Facility in New Orleans. The SLS stage is about 15 feet longer than the shuttle's external tank, and upon completion, will be shipped to the Kennedy Space Center on NASA's Pegasus barge, another infrastructure element used previously by the Space Shuttle Program.

The core stage will be shipped to NASA's Stennis Space Center in early 2016 for six months of testing. Then it will be shipped to Kennedy where it will be stacked inside the Vehicle Assembly Building into the full rocket that will launch at the end of 2017.

May said using shuttle components where possible saved considerable design and development costs. Also, NASA is counting on savings from modern manufacturing processes and has cut the agency's oversight requirements to further save money and time.

"We understand we've got to do things differently than in the past," May said.

Managers do not expect the agency to get additional money in the future and are planning to work only with the same annual funding NASA gets now.

"Flat is the new up," May said of the program's budget philosophy.

May added the program's focus now is on the initial SLS configuration designed to lift 70 tons into space -- strong enough to send the Orion spacecraft to the moon. Later configurations are expected to launch up to 130 tons, enough to carry landers or other spacecraft to multiple, deep-space destinations including near-Earth asteroids, Lagrange points, the moon and ultimately Mars.

For more information on SLS, visit http://www.nasa.gov/sls.

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Gene Goldman Holds His First All-Hands Meeting as Marshall Acting Director

Gene Goldman, left, addresses team members in Morris Auditorium during his first all-hands meeting as acting director of the Marshall Space Flight Center. Goldman praised the strength of the workforce, saying "Our mission is to enable the exploration of the universe and everyone here has a role in that." He also previewed his remarks for the May 17 Center Director's Breakfast, which will be held at the U.S. Space & Rocket Center's Davidson Center for Space Exploration. Goldman answered questions posted on ExplorNet, Marshall's online forum, and from the audience. Team members can watch the archived video stream of his remarks at the Launching Conversations blog on ExplorNet at https://explornet.msfc.nasa.gov/community/msfc/launchingconversations. (MSFC/Emmett Given)

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Marshall Center Completes Wind Tunnel Testing for Sierra Nevada Corp.'s Dream Chaser® Space System

By Kim Newton

The Marshall Space Flight Center successfully completed wind tunnel testing for Sierra Nevada Corp., or SNC, Space Systems of Louisville, Colo. The test will provide aerodynamic data that will aid in the design of the new Dream Chaser® Space System.

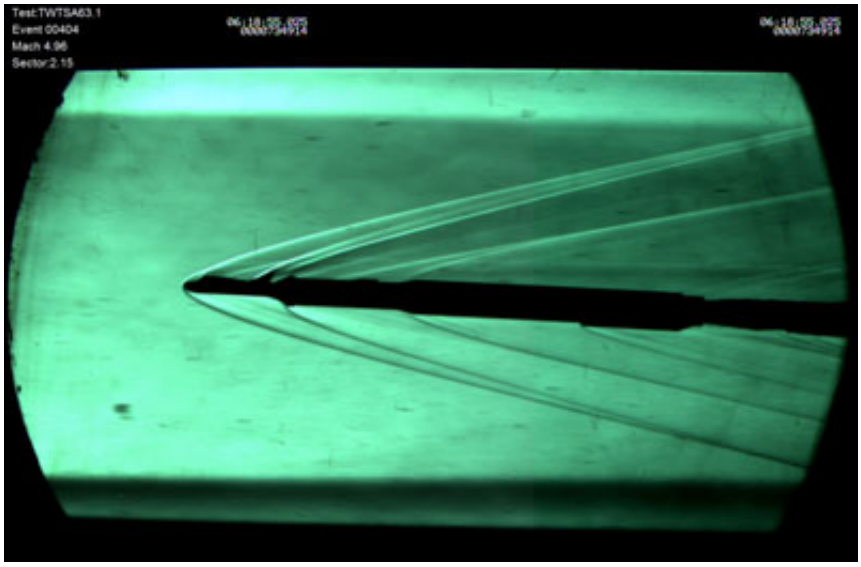

Image right: The Marshall Center successfully completed wind tunnel testing for Sierra Nevada Corp. During tests, a scale model of the Dream Chaser orbital crew vehicle was mounted on top of a scale model of the United Launch Alliance's Atlas V launch vehicle. (Sierra Nevada Corp.)

During tests at Marshall's wind tunnel facility, a scale model of SNC's Dream Chaser orbital crew vehicle was mounted on a scale model of the United Launch Alliance's Atlas V launch vehicle. Over 400 data runs were performed at subsonic, transonic and supersonic speeds to study the effects of how air moves past the model. Nine full-stack configurations were tested over a Mach range of .4, or 304 miles per hour at sea level, to Mach 5, or 3,800 miles per hour at sea level, at various launch vehicle roll angles.

The data generated from this test series, coupled with data from computational fluid dynamics studies, will define the aerodynamic characteristics of the Dream Chaser-Atlas V launch stack during the ascent phase of flight. Obtaining this data will enable higher-fidelity loads analysis, better definition of launch vehicle performance, and will aid in further refining Dream Chaser's trajectory design for orbital vehicle launches.

"We're glad Marshall could support SNC in completing these wind tunnel tests quickly and affordably and early in the design phase," said Teresa Vanhooser, manager of the Flight Programs and Partnerships Office at Marshall. "Our trisonic wind tunnel and engineering staff helps partners understand the aerodynamic integrity and stability of spacecraft and launch

vehicles, like the Dream Chaser, over a variety of wind speeds and phases of flight."

Mark Sirangelo, corporate vice president and head of SNC's Space Systems, said: "The Dream Chaser Program is grateful for the opportunity to leverage the experience, expertise, and resources of Marshall, made possible by the unique government-commercial partnership created through NASA's Commercial Crew Development Program. Sierra Nevada Corp. looks forward to expanding our successful relationship with Marshall, as well as creating new business opportunities in the Huntsville area."

Marshall's Aerodynamic Research Facility's 14-inch trisonic wind tunnel is an intermittent, blow-down tunnel that operates from high-pressure storage to either vacuum or atmospheric exhaust. The facility is capable of conducting tests in the subsonic, transonic and supersonic mach ranges using its two interchangeable test sections. Subsonic Mach numbers are below Mach 1, the speed of sound, or 760 miles per hour at sea level, while transonic speeds approach and are slightly above Mach 1. The facility can achieve a maximum supersonic Mach number of 5, or five times the speed of sound.

SNC is currently one of the NASA Commercial Crew Development, or CCDev, partners awarded funding under a Space Act Agreement to mature their Dream Chaser orbital crew transportation system. NASA's CCDev effort is being led by the Kennedy Space Center and supported by NASA technical experts across the agency, including the Marshall Center for a variety of technical areas.

The effort to define the aerodynamic characteristics of the Dream Chaser Space System is being conducted under a reimbursable Space Act Agreement funded by SNC and executed with the support of aerodynamicists and wind tunnel experts from the Marshall Center and United Launch Alliance.

For more information about the Marshall Center, visit http://www.nasa.gov/centers/marshall.

For more information on NASA's commercial Crew Program, visit http://www.nasa.gov/commercialcrew.

For more information about Sierra Nevada, visit http://www.SNCSpace.com.

Newton is a public affairs officer in the Office of Strategic Analysis & Communications.

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NASA Continues J-2X Powerpack Testing
NASA Status Report

NASA conducted a long duration test of the J-2X powerpack -- 340 seconds total -- at the Stennis Space Center May 10, marking another step in development of the next-generation rocket engine that will carry humans deeper into space than ever before.

Image left: NASA conducted a 340-second test of the J-2X engine's powerpack May 10 at the Stennis Space Center. The test is one in a series that began in February and will continue throughout the year. (NASA/SSC)

The powerpack is a system of components on

the top portion of the J-2X engine, including the gas generator, oxygen and fuel turbopumps, and related ducts and valves. On the full J-2X engine, the powerpack system feeds the thrust chamber system, which produces engine thrust.

The long-duration test was planned to operate the powerpack turbopumps over a range of speeds by varying the gas generator valve positions. The turbopumps have been heavily instrumented in order to determine performance and structural capabilities of this new design.

Test data provides critical information for continued development of the engine, which is the first human-rated liquid oxygen and liquid hydrogen rocket engine to be developed in four decades. The J-2X is being developed by Pratt & Whitney Rocketdyne of Canoga Park, Calif., for the Marshall Space Flight Center.

This test is part of a series of firings on the J-2X powerpack. The J-2X turbopumps were designed using test data from a 2008 test series at Stennis to gather data on Apollo-era J-2S turbopumps.

Watch the powerpack test at http://www.nasa.gov/mission_pages/j2x/12-055.html.

For more information on the J-2X engine, visit http://www.nasa.gov/mission_pages/j2x/index.html.

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MSFC Family Picnic to be Held June 2

By Megan Davidson

Want to enjoy games, music, great food and more? Come out to the MSFC Family Picnic, from 10:30 a.m. to 3 p.m. June 2. All Marshall Space Flight Center team members, retirees and their families are invited to the event, which will be held around the walking trail -- across from the Marshall Child Development Center -- and Buildings 4315 and 4316.

Lots of fun activities are planned, including a dunking booth, water activities and bingo. Bingo prizes will include flat-screen televisions and iPads. Bingo will be 50 cents per card, with a maximum of two cards per player per game.

"The Marshall Exchange has been planning for months to make this picnic and family fun day one of the best yet," said Edwin Jones, Marshall Exchange operations manager. "The location around the walking trail worked out great last year with plenty of shade and ease of access, so we're in the same place this year. Bingo, one of the most popular events at the picnic, is back with some super prizes. And we've partnered with Lawler's Barbecue to offer some of the best barbecue and food service around.

*Note: Barbecue & Veggie Plate Tickets are $5 and are available from your Admin Officer or the Space Shop until 4 PM Friday, May 25th

"This is the Exchange's one family-focused event each year that offers great memories for kids," he added, "and gives our employees a chance to show off their loved ones."

Members of the Marshall Exchange Music Club, special guests and local bands will provide a variety of tunes throughout the day. Most games and activities are free, with the exception of bingo, food and refreshments.

Meal tickets are $5 and must be pre-purchased through administrative officers by May 25. Barbecue plates include a choice of hand-pulled barbecue pork or turkey, potato salad, baked beans, coleslaw, bun, sauces and drink. Veggie plates include a salad, tomato wedges, cucumber slices, a baked potato, potato salad, coleslaw, a variety of dressings and a drink.

Although the lunch plates must be pre-purchased, hamburgers, hot dogs, chips, funnel cake sticks, snow cones and soft drinks will be sold the day of the event. For those over 21, beer also will be available for purchase.

A car, truck and bike show will be featured at the event, showcasing classic and exotic cars and motorcycles, owned and maintained by Marshall team members. The vehicles will be on display in the west lane of Morris Road alongside the walking trail parking area. A parking area for trailers is available in the lot adjacent to Building 4347, just south of the Marshall Medical Center.

Cash prizes of $50, $100 and $150 will be awarded to the top three vehicles. To participate in the car show, or to volunteer at the show, contact Rich Wegrich at 256-544-2626 by May 31. More details about the car show can be found on ExplorNet at https://explornet.msfc.nasa.gov/docs/DOC-7252.

Picnic parking will be available in the parking lots of several buildings adjacent to and surrounding the walking trail area, including the lot just north of the Marshall softball field on Pioneer Street. Overflow parking will be available at the Building 4200 complex. Other than Activities Building 4316, no Marshall Center buildings will be open during the event.

More information about the picnic will be available on ExplorNet.

Guidelines for non-badged family members
Family members arriving unescorted by a permanently badged team member must have a one-day pass prior to arrival. Team members can pick up one-day family passes from 8 a.m. to 3:30 p.m. May 21-31 at the security desk in the lobby of Building 4200. Marshall team members will be required to provide the name of the family member who will use the pass. Passes should be placed on the driver's side of the windshield. Drivers must present a valid driver's license, proof of insurance and vehicle registration when arriving at a Redstone Arsenal gate.

Marshall team members who wish to attend the event with a spouse, children or grandchildren who are non-U.S. citizens must pre-coordinate their access no later than May 25. Contact Protective Services' Sherman Wilson at Sherman.N.Wilson@nasa.gov for more information.

Davidson, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

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Marshall Team Invited to Spin Their Wheels in 11th Annual Director's Tour d'Arsenal
By Jessica Eagan

Plan to fasten your helmets and pedal your bicycles with fellow co-workers during the 11th annual Director's Tour d'Arsenal ride May 22.

The event, held every May in honor of National Bike Month, returns this year with "Director" added to the title. Marshall Space Flight Center's Stephen Doering, director of the Office of Center Operations, and Stephen Cornelius, director of missile development for the U.S. Army Aviation and Missile Research Development and Engineering Center, and other Marshall and Redstone Arsenal leaders, will lead the ride, beginning at 5 p.m. at the Building 4315 NASA Wellness Center parking lot.

Follow other cyclists along the historical railroad route around the southern part of the arsenal, making a loop along Dodd, Buxton and Patton roads and through the Army Test Area 1 and the NASA test areas. The route returns north along Patton Road, ending back at the Wellness Center.

"This year's Director's Tour d'Arsenal offers more visibility and credibility to cycling on Redstone Arsenal," said Jamie Miernik, organizer of the event and senior engineer for Jacobs ESTS Group, supporting Marshall's Engineering Directorate. "It is expected to be the largest group of cyclists ever assembled on the arsenal. All adult Marshall and Redstone personnel and their escorted guests are invited to bring their bicycles for an 18-to-25-mile ride on mostly flat roads with low traffic."

Pre-registration and a pizza party will be held that day from 11 a.m. to 12:30 p.m. in Activities Building 4316 for those who are participating.

Cyclists are required to wear helmets and bright reflective vests. Please bring a water bottle. A water stop will be provided midway through the ride.

The event is approved by Redstone Arsenal Family and Morale, Welfare & Recreation and will be hosted by the MARS Team Redstone Alliance Cycling, known as MTRAC.

MTRAC was established to encourage and enable bicycle riding for pleasure and as a mode of transportation on the arsenal to promote physical fitness, health, recreation, transportation and sporting events. Anyone who has access to the arsenal and their families are eligible for membership.

For more information about the Tour d'Arsenal or about MTRAC, contact Miernik at 544-6534, or visit here.

May 14-18 is National Bike to Work Week, with May 18 being National Bike to Work Day. Join others as they park their cars in their garages and ride to work on two wheels for a little before- and after-work exercise. For more information, visit here. For more information about bicycle safety and maintenance, visit here.

Children can celebrate National Bike Month by participating in the free ERC Kids Rocket Races on May 19 from 10-11 a.m. Kids under 12 years old can race in downtown Huntsville's Big Spring Park. For more information, visit here. Helmets are required. Participants will receive medals and goodie bags.

Eagan, an AI Signal Research Inc. employee and the Marshall Star editor, supports the Office of Strategic Analysis & Communications.

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Black Hole Caught Red-Handed in a Stellar Homicide
NASA news release

Astronomers have gathered the most direct evidence yet of a supermassive black hole shredding a star that wandered too close. NASA's Galaxy Evolution Explorer, a space-based observatory, and the Pan-STARRS1 telescope on the summit of Haleakala in Hawaii, were among the first to help identify the stellar remains.

Image left: This computer-simulated image shows gas from a star that is ripped apart by tidal forces as it falls into a black hole. (NASA, S. Gezari (The Johns Hopkins University), and J. Guillochon (University of California, Santa Cruz)

Supermassive black holes, weighing millions to billions times more than the sun, lurk in the centers of most galaxies. These hefty monsters lay quietly until an unsuspecting victim, such as a star, wanders close enough to get ripped apart by their powerful gravitational clutches.

Astronomers have spotted these stellar homicides before, but this is the first time they identified the victim. Using several ground- and space-based telescopes, a team of astronomers led by Suvi Gezari of the Johns Hopkins University in Baltimore identified the victim as a star rich in helium gas. The star resides in a galaxy 2.7 billion light-years away. The team's results appeared in the journal Nature.

"When the star is ripped apart by the gravitational forces of the black hole, some part of the star's remains falls into the black hole while the rest is ejected at high speeds," Gezari said. "We are seeing the glow from the stellar gas falling into the black hole over time. We're also witnessing the spectral signature of the ejected gas, which we find to be mostly helium. It is like

we are gathering evidence from a crime scene. Because there is very little hydrogen and mostly helium in the gas, we detect from the carnage that the slaughtered star had to have been the helium-rich core of a stripped star."

This observation yields insights about the harsh environment around black holes and the types of stars swirling around them. It is not the first time the unlucky star had a brush with the behemoth black hole.

The team believes the star's hydrogen-filled envelope surrounding the core was lifted off a long time ago by the same black hole. The star may have been near the end of its life. After consuming most of its hydrogen fuel, it had probably ballooned in size, becoming a red giant. Astronomers think the bloated star was looping around the black hole in a highly elliptical orbit, similar to a comet's elongated orbit around the sun. On one of its close approaches, the star was stripped of its puffed-up atmosphere by the black hole's powerful gravity. The stellar remains continued its journey around the center, until it ventured even closer to the black hole to face its ultimate demise.

Astronomers predict stripped stars circle the central black hole of our Milky Way galaxy. These close encounters are rare, occurring roughly every 100,000 years. To find this event, Gezari's team monitored hundreds of thousands of galaxies in ultraviolet light with the Galaxy Evolution Explorer, and in visible light with Pan-STARRS1. Pan-STARRS, short for Panoramic Survey Telescope and Rapid Response System, scans the entire night sky for all kinds of transient phenomena, including supernovae.

The team was looking for a bright flare in ultraviolet light from the nucleus of a galaxy with a previously dormant black hole. Both telescopes spotted one in June 2010. Astronomers continued to monitor the flare as it reached peak brightness a month later and slowly faded during the next 12 months. The brightening event was similar to the explosive energy unleashed by a supernova, but the rise to the peak was much slower, taking nearly one and a half months.

"The longer the event lasted, the more excited we got, because we realized this is either a very unusual supernova or an entirely different type of event, such as a star being ripped apart by a black hole," said team member Armin Rest of the Space Telescope Science Institute in Baltimore.

By measuring the increase in brightness, the astronomers calculated the black hole's mass to be several million suns, which is comparable to the size of our Milky Way's black hole.

Spectroscopic observations with the Multiple Meter Telescope Observatory located on Mount Hopkins in Arizona showed the black hole was swallowing lots of helium. Spectroscopy divides light into its rainbow colors, which yields an object's characteristics, such as its temperature and gaseous makeup.

To completely rule out the possibility of an active nucleus flaring up in the galaxy, the team used NASA's Chandra X-ray Observatory to study the hot gas. Chandra showed that the characteristics of the gas didn't match those from an active galactic nucleus.

For images, video and more information about this study, visit http://hubblesite.org/news/2012/18.

For graphics and information about the Galaxy Evolution Explorer, visit http://www.nasa.gov/galex and http://www.galex.caltech.edu.

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Expedition 31 Trio Blasts Off For International Space Station

NASA Flight Engineer Joseph Acaba, Russian Soyuz Commander Gennady Padalka and Flight Engineer Sergei Revin blasted off for the International Space Station at 10:01 p.m. CDT on May 14, from the Baikonur Cosmodrome in Kazakhstan.

Image right: The Soyuz TMA-04M rocket launches from the Baikonur Cosmodrome in Kazakhstan on May 15, 2012, carrying Expedition 31 Soyuz Commander Gennady Padalka of Russia, Flight Engineer Joseph Acaba of NASA and Flight Engineer Sergei Revin of Russia, to the International Space Station. (NASA/Bill Ingalls)

Acaba, Padalka and Revin are scheduled to dock their Soyuz TMA-04M spacecraft to the Poisk module of the station at 11:39 p.m. on May 16. They will join Expedition 31 Commander Oleg Kononenko of the Russian Federal Space Agency and Flight Engineers Don Pettit of NASA and Andre Kuipers of the European Space Agency, who have been aboard the orbiting laboratory since Dec. 23, 2011. The six astronauts and cosmonauts will work together for about two months.

NASA Television will provide live docking coverage beginning at 11 p.m. on May 16. Hatch opening and welcoming ceremonies will occur about three hours later on May 17.

Upon arrival, Acaba, Padalka and Revin will become members of the Expedition 31 crew, restoring the station's crew complement to six and continuing scientific research aboard the station.

Pettit, Kononeko and Kuipers are scheduled to return to Earth on July 1. Acaba, Padalka and Revin will return home in mid-September.

Also on board with the crew was a small "Smokey Bear" plush toy serving as the traditional Soyuz "talisman." Smokey Bear is the U.S. national symbol for wildfire prevention. Prior to the flight, Acaba explained he proposed flying Smokey Bear in an effort to raise awareness of human-caused wildfires. Acaba, an avid outdoorsman, holds two degrees in geology and served as an environmental education awareness promoter while in the U.S. Peace Corps.

For NASA TV streaming video, schedule and downlink information, visit http://www.nasa.gov/nasatv.

To follow Twitter updates from NASA's Expedition 31 astronauts, visit https://twitter.com/astro_Pettit and https://twitter.com/#!/astroAcaba.

For more information about Expedition 31 and the space station, visit http://www.nasa.gov/station.

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Obituaries

John Burton Cox, 86, of Huntsville died April 9. He retired from the Marshall Center in 1980 as an electronics engineer supervisor.

Arvard Kenneth Adams, 81, of Huntsville died April 19. He retired from the Marshall Center in 1994 as an experimental facilities development engineer.

Sam McClure, 90, of Decatur died April 20. He retired from the Marshall Center in 1974 as a quality assurance specialist.

Raymond Lee Lawrence, 81, of Huntsville died April 20. He retired from the Marshall Center in 1985 as a flight systems engineer. He is survived by his wife, Patsy Jones Lawrence.

Reita B. Pendergrass, 80, of Huntsville died April 25. She retired from the Marshall Center in 1974 as an administrative assistant.

Carl C. Askins, 84, of Hazel Green died May 2. He retired from the Marshall Center in 1974 as an aerospace engineering technician. He is survived by his wife, Oleen Askins.

Louis F. Foster, 83, of Monrovia died May 4. He retired from the Marshall Center in 1994 as an electrical engineering technician.

Bluford Spencer, 88, of Huntsville died May 8. He retired from the Marshall Center in 1984 as a wood crafter.

Find this article at:

http://www.nasa.gov/centers/marshall/about/star/index.html